



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/767,154	01/23/2001	Naoyuki Takahashi	31721-169084	1393

26694 7590 07/18/2003

VENABLE, BAETJER, HOWARD AND CIVILETTI, LLP
P.O. BOX 34385
WASHINGTON, DC 20043-9998

EXAMINER

SONG, MATTHEW J

ART UNIT PAPER NUMBER

1765

DATE MAILED: 07/18/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/767,154	Applicant(s) TAKAHASHI ET AL.	
	Examiner Matthew J Song	Art Unit 1765	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 June 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 3-8, 10, 13, -14, 16, and 18-28 is/are pending in the application.
- 4a) Of the above claim(s) 3-7 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 21 and 22 is/are allowed.
- 6) ☒ Claim(s) 1, 8, 13, 14, 18-20 and 23-28 is/are rejected.
- 7) ☒ Claim(s) 10 and 16 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. Claims 1 and 14 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claims 1 and 14 have been amended so that the buffer layer can be defined as comprising a hexagonal system crystal phase material, however this limitation is not supported by the specification on page 7 last paragraph, as suggested by applicant. Page 7 of the specification, clean or marked up copy, does not teach a hexagonal system crystal phase material. Also, page 5 of the instant specification only teaches a hexagonal shape and does not teach a "hexagonal system crystal phase material".

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out

Art Unit: 1765

the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1,8,13, 14, 18-20, and 23-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al (US 5,879,811) in view of Okano et al (JP 08-110425), an English abstract is provided, or in view of Tokunaga et al (JP 05-215929), an English abstract is provided.

Tanaka et al discloses a method of forming a thin film comprising an oxide single crystal having a quartz crystal structure, this reads on applicant's epitaxial film, (col 2, ln 10-62) on a single crystal substrate of an oxide, such as quartz, sapphire (col 5, ln 10-20) or a silicon single crystal substrate (Example 7). Tanaka et al also discloses a vapor phase deposition for producing an silicon dioxide thin film having a quartz crystal structure at atmospheric pressure using metal alkoxides, such as, $\text{Si}(\text{OCH}_3)_4$, $\text{Si}(\text{OCH}_3)_4$ or $\text{Si}(\text{OC}_3\text{H}_7)_4$ (col 7, ln 1-65), where these metal alkoxides read on applicant's tetramethoxysilane, tetraethoxysilane and tetrapropoxysilane, respectively.

Tanaka et al does not teach a third layer which is a buffer layer which is disposed between the substrate and the crystal thin film.

In a method of forming an optical wave guide, Okano et al teaches a buffer layer **21** is formed on the surface of a Si substrate and a quartz glass film composed of the same composition as the buffer layer is further formed on the quartz film (abstract). It would have been

Art Unit: 1765

obvious to a person of ordinary skill in the art at the time of the invention to modify Tanaka et al with Okano et al's quartz buffer because warpage is reduced.

In a method of forming a glass waveguide, Tokunaga et al teaches a buffer layer **2** of quartz is formed on a substrate and a pure quartz film **3** is formed on the buffer layer (abstract). It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Tanaka et al with Tokunaga et al's buffer layer of quartz to form a glass waveguide with a small transmission loss.

Referring to claims 1 and 14, the combination of Tanaka et al and Okano et al or the combination of Tanaka et al and Tokunaga et al teach a quartz buffer layer. Quartz inherently has a hexagonal crystal phase, as evidenced by applicant, note pg 5, lines 15-16 of the instant application and Kambe et al (US 6,290,735), below.

Referring to claim 8 and 19, Tanaka et al teaches a X ray diffraction profile exhibiting a diffraction peak at $2\theta=50.6^\circ$ in Fig 1, Fig 4 and Fig 5 for quartz.

Referring to claim 13 and 20, Tanaka et al also discloses the quartz crystal is widely used in an oscillator, a surface acoustic wave device for radio frequency filters, an optical waveguide, a semiconductor substrate, etc (col 1, ln 10-20).

Referring to claim 18, Tanaka et al teaches a sapphire substrate (col 5, ln 10-15).

Referring to claims 23-28, Claims 23-28 are directed to a product and the combination of Tanaka et al and Okano et al or the combination of Tanaka et al and Tokunaga et al teach a similar product, as claimed. Claims 23-28 further limit their respective independent claim by providing process limitations. The patentability determination of a product-by-process claim is

Art Unit: 1765

based on the patentability of the product does not depend on its method of production (MPEP 2113).

Allowable Subject Matter

4. Claims 21-22 are allowed.

5. The following is an examiner's statement of reasons for allowance: The closet prior art of record is Okano et al (JP 08-110425) and Tokunaga et al (JP 05-215929). The prior does teach a quartz thin film on a buffer layer made of quartz. However, the prior art does not teach or suggest the buffer layer being composed of GaN or ZnO.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

6. Claims 10 and 16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

7. The following is a statement of reasons for the indication of allowable subject matter: The closet prior art of record is Okano et al (JP 08-110425) and Tokunaga et al (JP 05-215929). The

prior does teach a quartz thin film on a buffer layer made of quartz. However, the prior art does not teach or suggest the buffer layer being composed of GaN or ZnO.

Response to Arguments

8. Applicant's arguments filed 6/11/2003 have been fully considered but they are not persuasive.

Applicant's argument against the finality of the rejection has been considered but has not been found persuasive. The applicant alleges the only change is claim 1 was a translation correction and would not necessitate a new search. The original claim recites "a crystal thin film" and the amended claim now recites a "quartz" film. The amendment changed the scope of claim by further limiting the claim to only one particular crystal, quartz. The new limitation would require further search and consideration, therefore is deemed proper.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., pure quartz) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Applicant alleges that applicant's product is pure quartz and the product of Tanaka contains germanium dioxide and trace amounts of alkali metals. Tanaka does teach products of quartz containing germanium dioxide, however Tanaka et al also teaches products of only silicon dioxide having a quartz crystal structure. Furthermore, Tanaka teaches a quartz diffraction profile as claimed by applicant, note instant claim 8.

Art Unit: 1765

Applicant's argument that Tanaka does not teach a CVD method to deposit SiO₂ at atmospheric pressure is noted but has not been found persuasive. Tanaka teaches forming silicon dioxide in a CVD process at a pressure of 0.01 Torr to atmospheric pressure (col 7, ln 1-40). Tanaka et al also teaches specific embodiments at pressure less than atmospheric, however Tanaka is not limited to the specific embodiments. Tanaka teaches an atmospheric deposition of silicon dioxide. Furthermore, it is noted that although the instant claims recite process limitations, the patentability determination of a product-by-process claim is based on the patentability of the product does not depend of its method of production (MPEP 2113).

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Tanaka et al teaches forming a single crystal quartz layer and Okano et al teaches forming a buffer layer.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., single buffer layer) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Okano et al teaches a quartz buffer layer, therefore reads on applicant's instant claims.

In response to applicant's argument that Okano et al and Tokunaga et al is nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was

concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, Okuna et al and Tokunaga et al teaches a method of forming quartz, which applicant's field of endeavor.

In response to applicant's argument that Okuna et al and Tokunaga et al teach forming quartz for an optical waveguide and applicant uses quartz for oscillation, a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the prior art. See *In re Casey*, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963).

In response to applicant's argument that the buffer layers obtain quartz without dislocations, the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Kambe et al (US 6,290,735) teaches silicon dioxide can have a variety of crystal structures such as hexagonal (quartz) or amorphous (col 10, ln 65 to col 11, ln 5).

10. This is a continuation of applicant's earlier Application No. 09/767154. All claims are drawn to the same invention claimed in the earlier application and could have been finally rejected on the grounds and art of record in the next Office action if they had been entered in the earlier application. Accordingly, **THIS ACTION IS MADE FINAL** even though it is a first action in this case. See MPEP § 706.07(b). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no, however, event will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew J Song whose telephone number is 703-305-4953. The examiner can normally be reached on M-F 9:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin L Utech can be reached on 703-308-3868. The fax phone numbers for the

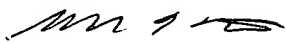
Art Unit: 1765

organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Matthew J Song
Examiner
Art Unit 1765

MJS
July 14, 2003


BENJAMIN L. UTECH
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700